CASE REPORT

INNOVATIVE METHOD FOR FABRICATION OF SECTIONAL IMPRESSION TRAYS FOR A PATIENT HAVING MICROSTOMIA

Prince Kumar, Harkanwal Preet Singh, Ashish Kumar, Chandni Jain

ABSTRACT

Prosthetic rehabilitation of microstomia patients presents difficulties at all stages as the maximal oral opening is smaller than the size of a complete denture. Several techniques have been described for use when either standard impression trays or the denture itself becomes too difficult to place and remove from the mouth. This article describes a different design for the fabrication of maxillary sectional trays to enable easier and efficient impression making in a patient with limited oral opening.

Key words: Microstomia; Sectional tray; Denture; Rehabilitation

Introduction

Microstomia is defined as an abnormally small oral orifice which can be due to various factors such as orofacial burns, carcinoma, cleft lip, trauma, scleroderma, genetic disorders, surgery, head and neck radiation, reconstructive lip surgeries, connective tissue disease, fibrosis of masticatory muscles or facial burns. Hardening of the skin around the mouth causes the oral opening to become limited. Moreover, fibrosis of the salivary glands results in dryness in the mouth. The literature contains reports on the fabrication of a foldable, posterior section with molar and premolar teeth and a second denture base on which anterior teeth were arranged. McCord et al described a maxillary complete denture consisting of two pieces joined by a stainless steel rod with a diameter of 1 mm fitted behind the central incisors. The different management techniques to aid prosthetic rehabilitation include surgery but this may lead to usual scar formation which further reduce mouth opening. Prosthetic rehabilitation of these patients presents difficulties right from the preliminary impressions to insertion of the prostheses. In prosthetic treatment, the loaded impression tray is the largest item requiring the intra-oral placement. During impression procedures, wide mouth opening is required for proper tray insertion and alignment which is not possible in patients with restricted mouth opening. The overall bulk and the height of impression trays make the recording of impressions exceptionally difficult if not impossible because the paths of insertion and removal of impressions are compromised by lack of clearance. A modification of the standard impression procedure is often necessary to accomplish this fundamental step in the fabrication of a successful prosthesis. This clinical report presented a different design for the fabrication of maxillary sectional trays for a patient with limited oral opening caused by scleroderma.

Case Report

A 58 year old male with limited oral opening caused by scleroderma sought treatment at the prosthodontic clinic at ITS Dental College for mandibular and maxillary dentures. On examination he had limited mouth opening with maximum diameter 27 mm and 11.4 mm circumference (Figure 1, Figure 2). Maxilla and mandible were completely edentulous and mild xerostomia was reported. Various treatment options were discussed and the patient agreed for the fabrication of upper and lower complete dentures using sectional trays for impressions as the mouth opening was restricted. Preliminary impressions were made with irreversible hydrocolloid. Smaller size tray was used and flanges of stock trays were adjusted to take the impressions. Casts were poured in plaster. A special tray with 1 mm full arch wax spacer was fabricated on primary casts. A sectional maxillary impression tray was designed with right and left sections that could be detached and then joined together in the correct original position. For mandibular arch conventional trays were made. Special tray was made using auto-polymerizing acrylic resin (Meliodent; Bayer UK Ltd., Newbury, United Kingdom). Using a thin cutting disk, tray was sectioned along the midline creating two equal halves (Figure 3). A notch was placed in the handle of the left section of the tray corresponding to projection on the right section of the tray (Figure 4). The stiff metallic tongue blades were used. Blades were cut of desired length and were bent on both the end. The bent ends were lubricated with petroleum jelly and they were placed on the tray at desired location. Auto polymerizing acrylic resin was mixed and placed on tray such that only bent ends were completely covered by acrylic (Figure 5). On both halves of tray two crevices were formed each, once the tongue blades were removed (Figure 6). It was rechecked for fit. Once tongue blade were placed there was no movement and the tray was closely approximated (Figure 7). The placement of the crevice was such that it did not hinder with the border molding and impression procedure. Border molding was performed for each half separately after checking the extensions in mouth (Figure 8). For secondary impression light body addition silicone was used. The trays were placed in the mouth. The left tray was removed and was loaded with impression material. The left tray was then placed back. After the left impression, the right section of the tray was removed loaded with material and placed in the mouth. The trays were removed individually from mouth and were re-approximated outside the mouth (Figure 9).

For mandibular impression procedure conventional tray was made as it could be easily placed in the mouth by rotating the tray 90 degrees and inserting. Border molding was done and medium body wash impression was made. Maxillo-mandibular relations were recorded followed by try in of waxed dentures. Maxillary and mandibular complete dentures were fab-
ricated using conventional technique & delivered to patient (Figure 10). At the insertion appointment patient was instructed about the insertion and removal of dentures. Oral hygiene instructions were reinforced and Periodic recall appointments were scheduled.

Discussion
Scleroderma is an autoimmune multi-systemic disease associated with vascular abnormalities, connective tissue sclerosis and autoimmune changes. Almost all patients have vascular symptoms that usually predate the development of the fibrotic connective tissue change. Oral manifestations of scleroderma include: microstomia, xerostomia, periodontal disease, widened periodontal space, and bone resorption at the angle of mandible. Limited oral opening can pose a major dental problem and the general difficulties of reduced access becomes even more apparent when providing prostheses. The overall bulk of the height of impression tray makes recording impression exceptionally difficult if not impossible because the paths of insertion and removal of impressions are compromised by the lack of clearance. Various pins, bolts, and Lego pieces have been used for the locking mechanism of sectional impression trays fabricated for patients with limited oral openings. A sectional stock tray system for making preliminary impressions was described by Luebke. Impression making using sectional trays may be easier for patients with constricted oral openings because the two halves can be inserted independently, removed separately and reassembled extra orally. Improved fit of the tray was possible for the individual dental arch because the two halves separately fitted to each side of the arch thus achieving better anatomical adaptation to the soft tissues. Several stock and custom tray designs have been described in literature. Sectional impression trays have been fabricated using: Recesses, Orthodontic screws, Lego blocks (Lego systems inc., Enfield, CT), Dowel plug holes and a screw joint for rigid connection, Locking levers, Interlocking tray segments, Flexible impression tray with silicone putty. Most important requisite when sectional trays are used is provision of mechanism which can aid accurate adaptation and stability of the two section of the tray to each other intraorally and extra orally. Also the technique used should not be complicated and should allow easy manipulation and should decrease patient trauma. Anterior and posterior lock is both...
Innovative method for fabrication of sectional impression trays

important for better stability. The given technique for sectional tray fulfills all these criteria. Presence of interlocking in the handle aid in anterior re-approximation whiles the tongue blade help in posterior re-approximation and stability. Also this technique is easy and requires less chair side time for fabrication. However, this design of the connection line along the midline of the foldable pieces of the tray helped ensure stability between them.

**Conclusion**

Making impressions is an important step in construction of complete denture. It is more challenging in microstomia patients. However, use of sectional special tray can be beneficial and should be advocated whenever the need arises.

**Authors Affiliations**


**References**


**How to cite this article**


**Address for Correspondence**

Dr. Prince Kumar MDS, ITS Dental College, Ghaziabad, Uttar Pradesh, India.

Email: poojagupta20032007@gmail.com

Source of Support: Nil

Conflict of Interest: None Declared